

## 4 Best Dry Ice Experiments for Kids

### **Materials:**

- 1-2 lbs of dry ice broken up into smaller chunks (Call around to grocery stores. You should be able to find one that sells it. If you order perishables you might get lucky to find some left over in your shipping box.)
- Metal spoon
- Ice cubes
- Ziplock sandwich bags (2)
- Dish soap diluted in water (about 1:1 ratio)
- Ripped off piece of a dish rag or ribbon

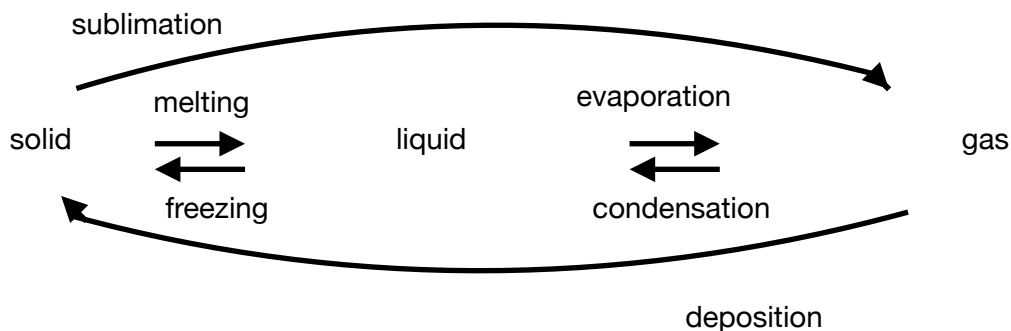
### **Safety:**

Dry ice freezes around  $-80\text{ }^{\circ}\text{C}$ . **Do not** let it touch your skin. Always wear gloves, or use tongs. Dry ice undergoes sublimation turning into carbon dioxide gas. If you do this experiment inside you should open the windows. I crack the windows when I have it in the car too.

### **Phase Changes:**

Place a regular ice cube in a ziplock bag (try to squeeze out all of the air). Discuss what will happen to the ice cube at room temperature. Use this as an opportunity to introduce the terms solid, liquid, and melting. Ask what happens to water when we heat it in a saucepan. Use this to introduce the terms gas and evaporation. You can also introduce the terms freezing and condensation. For older kids, you might choose to show the diagram below.

Explain that dry ice is solid carbon dioxide, and it undergoes a phase change at room temperature that is less common. It goes from a solid directly to a gas. This is called sublimation. The reverse of sublimation (going from a gas to a solid) is called deposition, but I would only mention this for older students (above 3rd grade). Place a piece of dry ice in a second ziplock bag (again, try to squeeze out all fo the air). Tell the students that you will keep an eye on the ice cube and dry ice in the baggies throughout the experiment.



### **Singing Spoon (aka Screaming Witch):**

Dip your spoon into warm water, then hold it right up to a chunk of dry ice about the size of a golf ball. The warmth from the spoon speeds up the sublimation process causing more gas molecules to hit the spoon. This pressure causes vibrations resulting in sound.

Go back to your baggies now. What is happening to the ice? It should be melting. What is happening to the dry ice? You should see pressure building up in the baggy from the sublimation process. Use this visual to help explain the pressure on the vibrating spoon.

### The Volcano:

Fill a tall glass with warm water. Add a quarter size chunks of dry ice. This will speed up the sublimation process. Once you see the carbon dioxide gas rolling off the top, add a squirt of soap. The soap bubbles will trap the carbon dioxide gas. The kids can pop the bubbles to release the gas (but they should NOT try to touch the dry ice).

### The Crystal Ball:

Fill a clean glass bowl with warm water. Submerge a piece of dish rag (or ribbon) in your soap solution. Get some of the soap mixture on your finger, and rub it along the rim of the bowl. Add a chunk of dry ice (size depends on the size of your bowl). Use your dish rag to create the crystal ball by dragging it along the top of the rim. This will likely take multiple tries! I recommend watching the video of this before trying on your own. It is super fun to see how big the bubble can get before it pops. You can try this with a smaller bowl first, then move to a larger bowl which is more challenging. Don't forget to discuss what is inside the soap bubble!

### Questions:

1. Why do we have to handle the dry ice with gloves?
2. What is inside the crystal ball bubble?
3. Write in the missing phase changes in the boxes below:

